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On December 14 no trace of it could be made out with any certainty.

On November 20, 8^h $2^m.0$, Mount Hamilton mean time, it was in transit, and its longitude was 110°·9.

The Great Red Spot.

This object seems again to be slackening its rate of rotation. During the past opposition its longitude remained quite constant at about 3°. Its longitude is now increasing. A transit on December 14, 5^h $5^m.3$, gave the longitude = 6°·4. It is now very much more conspicuous than at opposition, and is a stronger red in colour.

Mount Hamilton :
1891 *December* 17.

Reappearance of Saturn's Ring, and Position Angle before the disappearance, observed at the Observatory, Utrecht. By Professor J. A. C. Oudemans.

The telescope of the Utrecht Observatory has an object-glass of Jacob Merz, aperture 0·260 metre; focal distance 3·200 metres. The eyepiece employed was a positive one of Steinheil, with a magnifying power of 162.

1891 October 28, 18^h, M. T., Utrecht. Hazy. *Saturn* decidedly without ring.

1861 October 29, 17^h 30^m. M. T., Utrecht. Clear. *Saturn* decidedly without ring. A thin dark line crosses the disc along the equator.

1891 October 30, 16^h–19^h. Overcast.

1891 October 31, 17^h 30^m. Clouds. *Saturn* visible for a moment; at both sides the ring is visible as a thin bright line.

1891 November 1, 17^h–19^h. Overcast.

1891 November 2, 17^h 15^m. M. T., Utrecht. Clear; a little hazy. Ring clearly visible; very beautiful, with the feeblest magnifying power 114. The dark line across the planet still visible. It seems to me that this dark line must be the dark ring.

I give these observations without comment, judging it better to wait for other observers' results.

After a careful discussion I adopted for the fourth edition of Kaiser's *Sterrenhemel* the following values of the dimensions of *Saturn* and his rings at the mean distance 9·53885 (see that Work, ii. p. 701):

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	Diameter.	Semidiameter.
	″	″
Outer ring, exterior	39·5	19·75
Inner ring, interior	27·5	13·75
Dusky ring, interior	21·8	10·9
Equatorial	17·3	8·65
Polar	15·4	7·7

If the mass of the bright rings is supposed to be $\mu \times$ the mass of the planet, and if the ring's density is supposed to be the same as *Saturn's*, we deduce from these numbers that the thickness of these rings is $3''\cdot82\,\mu$.

$$\text{With } \mu = \frac{1}{118} \text{ (Bessel)} \quad \text{this becomes } 0''\cdot0324$$

$$\text{,,} \quad \mu = \frac{1}{314} \text{ (H. Struve)} \quad \text{,,} \quad \text{,,} \quad 0''\cdot0121$$

The Sun, seen from *Saturn*, presents itself as a disc of $32' : 9\cdot53885 = 3'\cdot355$, and the distance of the interior diameter of the interior bright ring being $13''\cdot75 - 8''\cdot65 = 5''\cdot1$, as long as both the sides of the ring have sunshine,* the remaining shadow of the rings on the planet is

$$\left.\begin{matrix} 0''\cdot0324 \\ \text{or } 0\cdot0121 \end{matrix}\right\} - 5''\cdot1 \sin 3'\cdot355 = \left.\begin{matrix} 0''\cdot0324 \\ \text{or } 0\cdot0121 \end{matrix}\right\} - 0''\cdot0050 = \left\{\begin{matrix} 0''\cdot0274 \\ \text{or } 0\cdot0071 \end{matrix}\right.$$

whereas, according to Bessel's elements, adopted in the *Nautical Almanac*, the earth's elevation above the ring's plane was

	h		° ′
on Oct. 28	18	M.T.Gr.	1 57·7
Nov. 2	18	,,	2 8·5

We will take the mean 2° 3′·1; so the breadth of the dusky ring near to the centre of the planet is $2''\cdot85$ sin. $2°\ 3'\cdot1 = 0''\cdot102$; however small this number be, it is much larger than either $0''\cdot0274$ or $0''\cdot0071$, the breadth of the ring's shadow on the planet, adopting either Bessel's or H. Struve's mass of the ring.

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* The Sun's elevation changes 18′·4 in 20 days, *i.e.* 0′·92 in a day, so the time during which both sides of the ring have sunshine is about 3½ of our days.

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Position-Angles of the Ring, measured with the wire micrometer.

1891.	M.T. Utrecht.	Pos. Angle.	Naut. Alm.	Corr. of N.A.
	h m	° ′	° ′	′
June 24	8 57·5	−5 15·0 (5)	−5 34·7	+19·7
26	8 44·7	−5 11·0 (4)	−5 34·1	+23·1
28	8 51·5	−5 6·5 (5)	−5 33·45	+26·95
July 4	8 43	−5 48·0 (5)	−5 31·4	−16·6
5	8 37·5	−5 26·5 (5)	−5 31·0	+ 4·5
10	8 24·6	−5 41·5 (3)	−5 29·0	−12·5
July 1	12 43·1 = 12 22·6 M.T.Gr.	−5 24·7	−5 32·3	+ 7·6

The numbers in brackets indicate the numbers of measures, which, however, have not been taken into account in deducing the mean.

Utrecht:
1891 *December* 14.

Observations of Occultations of Stars by the Moon, and of Phenomena of the Satellites of Jupiter and Saturn, made at Mr. E. Crossley's Observatory, Bermerside, Halifax, in the year 1891.

By J. Gledhill.

Lunar Occultations.

1891 January 17.—*ξ Arietis.* Disappearance, G.M.T., $11^{h}\ 3^{m}\ 20^{s}\cdot5$. Time by *N. Almanac*, $11^{h}\ 5^{m}$. Definition not good.

1891 March 26.—*l^{2} Virginis.* Disappearance, $10^{h}\ 3^{m}\ 8^{s}$. Time by *N. Almanac*, $10^{h}\ 1^{m}$. Stormy.

1891 April 18.—42 *Leonis.* Disappearance, $10^{h}\ 27^{m}\ 56^{s}$. Time by *N. Almanac*, $10^{h}\ 35^{m}$.

Phenomena of Jupiter's Satellites, observed with the 9⅓-inch Cooke Equatorial Refractor.

Date.	Satellite and Phenomena.		G.M.T. of Observation.	Time by Nautical Almanac.
1891.			h m s	h m s
Aug. 22	I. Ec. D.	Began to fade.	10 6 30	10 10 17
		Half gone.	10 8	
		Last seen.	10 10 58	
29	I. Ec. D.	Began to fade.	12 3	12 5 14
		Half gone.	12 4 30	
		Last seen.	12 5 45	